Minutes of spin meeting 06/04/08

In run6, we have tested AGS polarization transmission efficiency with various cold snake strengths while keep the warm snake strength fixed. Fanglei presented her spin tracking results for the AGS whole ramp with various cold snake strengths (1.5T, 2.0T and 2.5T). Haixin pointed out that the actual cold snake filed in run6 was 2.1T. Woody also pointed out that the compensation quads used in the simulation may not reflect the real fields as the settings evolved during the run. But these effects are expected to be small. The simulations were done for 50 particles in a Gaussian distribution with rms horizontal emittance of 2πmm-mrad and rms vertical emittance of 2.44πmm-mrad. The ramp rate was taken from the real magnet cycle. The tune path measured in early May of 2006 was first used for the tracking. She has to push vertical tune higher at $G\gamma = 7, 27,$ and 45 to get rid of some sudden polarization drop (due to depolarization resonances associated with vertical motion). With such a "perfect" machine, The total polarization transfer efficiency is about 72% at the extraction point for the 2T cold snake case. This is the rms average of the whole beam. Waldo pointed out that the CNI polarimeter was on the other side of the two partial snakes and the vertical polarization there could be slightly different. In addition, this is the rms averege over the whole beam while CNI measurements were done with target centered in the peak. The simulation showed that 10% polarization was lost before $G\gamma$=7.5, where there was no strong depolarizing resonance. However, the ramp rate is very slow at the begining part and the orbit distortion due to partial snakes are large at these low energies. As Thomas pointed out, this was the motivation for the injection-on-the-fly test. Leif suggested to track for injection-on-the-fly lattice just for the early part. She is also going to do tracking with more particles and diffeent random seeds for the early part of the ramp. The simulation also showed that the 2T cold snake was the best among the three cold snake strengths. Thomas asked why we could not push vertical tune higher than 8.95 near injection. Haixin replied that this was based on the MAD calculation that we have to keep the beta function small enough to fit into the physcial aperture, but the issue should be revisited.

Haixin